To: Scott, Ashby (DEQ)[Ashby.Scott@deq.virginia.gov]; Gerhard, Sasha[Gerhard.Sasha@epa.gov]
Cc: leslie.romanchik@deq.virginia.gov[leslie.romanchik@deq.virginia.gov]; Shuster, Kenneth[Shuster.Kenneth@epa.gov]; Galbraith, Michael[Galbraith.Michael@epa.gov]; Crosby-Vega, Terri[Crosby-Vega.Terri@epa.gov]; Gaines, Jeff[Gaines.Jeff@epa.gov]; Colon, Lilybeth[Colon.Lilybeth@epa.gov]; McGoldrick, Catherine[McGoldrick.Catherine@epa.gov]; pizarro, luis[pizarro.luis@epa.gov]; Gullett, Brian[Gullett.Brian@epa.gov]; Wanslow, Julie[Wanslow.Julie@epa.gov]
From: Craig, Harry
Sent: Mon 9/19/2016 8:16:58 PM
Subject: RE: Draft QAPP for Radford Arsenal OBG Flyer Testing

Ashby,

Nitroglycerin is a common component of double base (NC/NG) gun propellants. The source is likely from incompletely combusted propellant, rather than formation during combustion. NG is bound to the NC matrix in the propellant itself and is what makes it persistent, since NC matrix is insoluble in water. Here is a table of the common propellants that contain NG:

Table 9-2. Composition and Properties of Pr

	M1	M2	M5	M6	M8	M10
Nitrocellulose (NC), %	85.00	77.45	81.95	87.00	52.15	98.0
%/o Nitrogen in NC %	13.15	13.25	13.25	13.15	13.25	13.1
Nitroglycerin,%	-	19.50	15.00	-	43.00	-
Barium nitrate, %	-	1.40	1.40	-	-	-
Potassium nitrate, %	-	0.75	0.75	-	1.25	-
Potassium sulfate, %	-	-	-	-	-	1.00
Lead carbonate, %	-	-	-	-	-	-
Nitroguanidine, %	-	-	-	-	-	-
Dinitrotoluene, %	10.00	-	-	10.00	-	-
Dibutylphthalate, %	5.00	-	-	3.00	-	-
Diethylphthalate, %	-	-	-	-	3.00	-
Diphenylamine, %	1.00[a]	-	-	1.00[a]	-	1.00
Ethyl centralite, %	-	0.60	0.60	-	0.60	-
Graphite, %	-	0.30	0.30	-	-	0.-10
Cryolite, %	-	-	-	-	-	-

Regards,

Harry Craig

From: Scott, Ashby (DEQ) [mailto:Ashby.Scott@deq.virginia.gov]
Sent: Monday, September 19, 2016 10:14 AM
To: Gerhard, Sasha <Gerhard.Sasha@epa.gov>
Cc: leslie.romanchik@deq.virginia.gov; Shuster, Kenneth <Shuster.Kenneth@epa.gov>; Galbraith, Michael <Galbraith.Michael@epa.gov>; Crosby-Vega, Terri <Crosby-

Vega.Terri@epa.gov>; Gaines, Jeff <Gaines.Jeff@epa.gov>; Craig, Harry <Craig.Harry@epa.gov>; Colon, Lilybeth <Colon.Lilybeth@epa.gov>; McGoldrick, Catherine <McGoldrick.Catherine@epa.gov>; pizarro, luis <pizarro.luis@epa.gov>; Gullett, Brian <Gullett.Brian@epa.gov>; Wanslow, Julie <Wanslow.Julie@epa.gov>
Subject: RE: Draft QAPP for Radford Arsenal OBG Flyer Testing

Sasha,

Thank you for your comments. To clarify, the public was not the driver for the emissions sampling at Radford. VA DEQ requested all of our Subpart X permitted facilities to perform the testing as part of the permit renewal process and Radford was the only facility which agreed to pursue it. Since bang box emission factors were used for the risk assessment in the initial permitting process DEQ wanted unit-specific emissions data which would more accurately represent the emissions from the OBG.

The Radford facility already has a soil monitoring program included in the conditions of the current Subpart X permit so we have plenty of site specific soil monitoring data. What it's showing us is that nitroglycerin has been the only contaminant to be detected at levels above the action levels included in the permit on a regular basis. Whether the cause of this is from the other contaminants in waste propellant being completely combusted during the OB procedure or from incompletely combusted contaminants being deposited in the river and swept away is unknown at this time. However that question could be addressed with a mass balance using the emissions data from the sampling Dr. Gullett and his team will be performing.

While I agree that there are a lot of unknowns which could influence the data collected during the sampling given the nature of an OB operation and the lack of any air emissions data for these units, we won't know how well the sampling can characterize the plume until we review the final data collected. From my experience in air permitting, site and unit specific emission factors will always be a better data source for making permitting determinations than generalized emission factors which do not accurately reflect the combustion profile from the unit.

Fugitive emissions from the OB operations should be limited as propellant is the main waste material being treated and it tends to burn very quickly. I would only expect to see fugitive emissions from the miscellaneous waste materials being burned as they are just

contaminated with propellant material and have a slower burn rate than the propellants themselves. Since the majority of the waste burned is actual propellant I see the potential fugitive emissions as a negligible contribution to the overall emissions from the OB operation.

Again DEQ thanks you for the comments provided. Aside from the soil sampling, which I feel is unnecessary due to the current monitoring plan in place, please send along any additional suggestions to address your comments.

Thanks,

Ashby

Ashby R. Scott
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From: Gerhard, Sasha [mailto:Gerhard.Sasha@epa.gov]
Sent: Monday, September 12, 2016 5:47 AM
To: Scott, Ashby (DEQ)
Cc: Romanchik, Leslie (DEQ); Shuster, Kenneth; Galbraith, Michael; Crosby-Vega, Terri; Gaines, Jeff; Craig, Harry; Colon, Lilybeth; McGoldrick, Catherine; pizarro, luis; Gullett, Brian; Wanslow, Julie
Subject: Draft QAPP for Radford Arsenal OBG Flyer Testing

Hi Ashby,

Our apologies for not getting back to you before the deadline. I would like to preface our

comments by noting that we understand that the public is the driver for this flyer testing, and thus, it was not designed to address our broader concerns regarding emission factor development.

Ken, Harry Craig (R10), and I reviewed the QAPP. As alluded to above, we view this more as a research project that will attempt to improve our ability to characterize air emissions from open burning, rather than, in our opinion, a project that will enable a definitive characterization of total air emissions from open burning as the plan implies. The project will likely improve our knowledge of emission contaminants (i.e., their presence) in the air, and be able to quantify what the samplers capture, but we have reservations that the effort will be able to capture enough representative samples to enable a definitive calculation (quantification) of the total emissions, or mass balance analysis, as the plan implies.

We have two major observations/comments. Our first comment pertains to the limited scope of the testing; there is no confirmation sampling of the fallout and kick-out at the ground level. That is, the project's sole focus is to collect combusted air emissions from the plume. That is not necessarily a bad thing, as it certainly is beneficial to collect additional data from live events (versus laboratory) for continued development of emission factors (EFs). As we discussed a few months ago on a conference call with you and Leslie, we are concerned that the EFs under development do not account for deposition of fallout and kick-out onto the soil, which is a critical factor in development of EFs for OB/OD. Ideally, we would like to see this test also include confirmative soil deposition profiles (i.e., sampling of fallout and kick-out on the ground, using such collection methods as tarps or sampling trays), since we feel air sampling misses a lot (discussed in our second comment). Unfortunately, the location of the Radford burn pans along the New River limits the ability to take representative ground level (soil) samples...which is a separate concern of ours regarding the suitability of this site location.

Our second comment regards the elusive nature of fugitive air emissions and the difficulties in capturing samples that are representative enough to enable quantifications of total emissions, i.e., to enable the emissions factors projections that are proposed. The ability to take representative, reproducible, and meaningful air samples is impacted by many factors including the position of the sampler relative to the plume, the timing of the initiation and conclusion of sampling in the plume, the speed at which the sample is taken, dilution, interferences from other contaminants, meaningful detection limits, velocity of contaminants, dispersion, duration and volume of the sample, wind speed and direction, drone speed, and so forth, let alone the sampling problems that arise from the energetic forces propelling contaminants (especially true of open detonation). Thus, it is difficult to know definitively whether the reported results will be truly representative. In short, to do the proposed calculations, the concentration of every contaminant throughout the whole plume on a volumetric basis is needed. This is why, in the RCRA program we emphasize soil monitoring over air monitoring. As mentioned above, it would be beneficial to be able to correlate the emissions captured by the drone to the deposition on the soil.

We appreciate the opportunity to review and comment.

Regards,

Sasha

Sasha Gerhard

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